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ABSTRACT

The purpose of this study was to determine whether clozentropy would reveal the amount and rate of language change in a specific social group. Students in four basic interpersonal communication classes at the University of Wyoming were selected at the beginning of the semester to serve as subjects for this study. Two major conclusions were reached in this study: the degree of language change in the four independent classrooms changed significantly over the semester, with the change in the direction of higher clozentropy scores, and the rate of change was situationally dependent. (RB)

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THE MEASUREMENT OF LANGUAGE CHANGE

by

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THE MEASUREMENT OF LANGUAGE CHANGE

Language scholars agree that language is a changeable, socially influenced process. The following statement by Hertzler is representative of the commonly held language change assumption:

> . . . vocabulary can change much and rapidly, both for individuals and groups. It does and must have a comparatively high degree of flexibility, malleability and extensibility. This means, first, that it is highly sensitive and responsive to the changes of the sociocultural world, however induced; . . .[1]

Acceptance of the change assumption allows for some understanding of language development, but until the nature of the change is explained specifically, few accurate language predictions can be made. The crucial and missing element in the study of language change is measurement. This descriptive study demonstrates that language change and the rate of that change can be measured precisely.

The basis for measuring language change lies in the relationship between language and the social group. Gumprez (1964) explained that because of social restraints placed on language choice, language then becomes part of the social structure. By including variables such as grammatical systems and cultural norms, language then is viewed as a form of social behavior. Thus, language change can be treated as a special case of social change.[2] To precisely measure language change the influence exerted by the social group must be included. Once the social group influence is accounted for, accurate predictions of language and social behavior can be set forth.

In this study the method selected for measuring the amount and rate of language change was clozentropy, developed in 1970 by Darnell.[3] The scores produced by the clozentropy measure represent the degree to which an individual's language is similar to that of other members of a social group. For example, if a subject in a test group, when completing a cloze test, responds with vocabulary answers different from those of the other subjects, his clozentropy score will be lower than that of a subject who responds with the same vocabulary answers as the other members in the group. The higher an individual's clozentropy score, the more linguistically compatible he is with the social group. The salient feature of the clozentropy measure in this study was the inclusion of the language norms in the measurement. It was hoped that this would permit precise determination of the amount and rate of language change for the social group and the individual. Thus, the research question became: will clozentropy reveal the amount and rate of language change in a specific social group?

DESIGN AND PROCEDURE

Students in four basic interpersonal communication classes at the University of Wyoming were selected at the beginning of the semester to serve as subjects for this study. There were three testing sessions during the semester. Each subject was exposed to a total of four measures. At the first testing session, which took place during the first week of classes, the subjects responded to the first and second measures (O_1 O_2). The second testing session took place one month later. At that time the subjects responded to the third measure (O_3). The fourth measure (O_4) was completed during the third testing session, which was held the last week of the semester (See Figure 1).

Figure 1

	Testing Period 1	Testing Period 2	Testing Period 3
Group I	O_2 O_1	O_3	O_4
Group II	O_2 O_1	O_3	O_4
Group III	O_1 O_2	O_3	O_4
Group IV	O_1 O_2	O_3	O_4

The measures consisted of four cloze examinations which were adapted from messages written by the respective interpersonal communication instructors. The instructors wrote messages that described a phase of the human communication process. The adaptation of the messages was done by simply replacing every tenth word in the passage with a ten-space blank. The subjects in each class were instructed to complete measure O_i by placing their own vocabulary decision in each blank. Measure O_2 differed only in the instructions; the subjects were asked to predict what word the instructor originally used in each blank. Presentation of O_1 and O_2 was reversed in the groups in order to control for order effect. Also, the procedure permitted assessment of the main effect produced by the different instructions. The third test, given a month after tests O_1 and O_2, used the same message and the instructions were to predict the instructor's vocabulary choice. The fourth test given at the end of the semester was a duplicate of the third test.

Test sensitization was an obvious concern in this study. One could reason that the subjects would be measured as more linguistically compatible during the course of the semester simply because they were exposed to the same basic instrument four times. These procedures, however, counteracted any tendency for increased compatibility due solely to test

sensitization. If sensitization existed, the subjects would have, because of prior commitment, responded with the same answer as before. This would, in turn, ward against increased compatibility due to measuring error. Given the conservatism of these procedures, any language changes which were measured under these stringent conditions should be valid changes.

ANALYSIS

Reilly's adaptation of Darnell's (1970) method of scoring clozentropy was used because of simplicity, and the concern that only the change in clozentropy scores was relevant to this study.[4] The formula $T_k = \sum^{m} \log_{10} n_{ijk}$ produces only positive scores, and the higher the score an individual receives the more compatible or similar his language is in comparison with the other members of the group who completed the test. Since each group was independent of the other groups, and different messages were used, no analysis could be completed between groups.

A One Way Analysis of Variance was used to determine if a significant language change had occurred within the groups (See Table 2).[5] Since significance was reached within each group, the T-Method of multiple comparisons was used to determine at what testing period in each group the significant language changes occurred (See Table 3).[6]

An examination of the means indicated that the language of the subjects per each group changed over a period of time (See Table 1). Also, the change was in the direction of more language compatibility within the group.

Table 1

MEANS OF CLOZENTROPY SCORES AT THE FOUR TESTING PERIODS

	Test I	Test II	Test III	Test IV
Group I N = 11	17.364	16.364	20.182	20.909
Group II N = 18	18.722	19.722	20.222	21.333
Group III N = 16	17.375	16.313	18.625	20.625
Group IV N = 31	27.000	29.000	28.935	30.323

As the analysis proceeded, the language change proved to be a statistically significant change in all four groups. As can be seen in Table 2, three of the four F scores were significant at the .01 and one at the .05 alpha level.

Table 2

ONE WAY ANALYSIS OF VARIANCE RESULTS OF CLOZENTROPY SCORES PER GROUP

Group	df	ms	f	p
Group I	3,40	52.51,4.04	12.994	.01
Group II	3,68	21.22,6.92	3.068	.05
Group III	3,60	54.93,6.31	8.704	.01
Group IV	3.120	58.05,13.51	4.299	.01

Another concern when scrutinizing the results was the difference produced between tests O_1 and O_2, regardless of order, it can be concluded that the different instructions were deemed irrelevant by the subjects. Thus, the validity of the measures that followed was enhanced, as the language compatibility of each group appears stable despite different stimuli used to produce the language response (See Table 3).

Finally, when the multiple comparisons were completed each group had at least one statistically significant multiple comparison.

Table 3

MULTIPLE COMPARISONS (TUKEY) BETWEEN MEAN CLOZENTROPY TESTS PER GROUP

Comparison Tests	Group I $\bar{X}$ Difference N = 11	Group II $\bar{X}$ Difference N = 18	Group III $\bar{X}$ Difference N = 16	Group IV $\bar{X}$ Difference N = 31
O_1-O_2	1.0	1.0	1.062	2.0
O_1-O_3	3.818*	.50	1.250	1.935
O_1-O_4	4.545*	.807	3.250**	3.230**
O_2-O_3	2.818*	2.598	2.312	.065
O_2-O_4	3.545**	4.211*	4.312**	1.323
O_3-O_4	.727	1.7904	2.000	1.388

* $p < .05$
** $p < .01$

A post hoc analysis was undertaken to determine if the instructor's language in each class was different from the class's clozentropy scores. Darnell (1970) described the method of scoring a nonmember or outside

members of the particular social group by scoring them as "outsiders."[7] The essence of this scoring procedure is the use of the criterion group's values per each blank, and then scoring the outside member as though he were a member of the criterion group. In keeping with this procedure, the instructor's scores were plotted on each group's clozentropy distribution. In each class the instructor's clozentropy score differed less than one standard deviation from the class mean.

CONCLUSIONS

Two major conclusions were reached in this study. First, the degree of language change in the four independent classrooms changed significantly over the semester. The change was in the direction of higher clozentropy scores, which means that each group was more compatible linguistically at the end than at the beginning of the semester. The significant F scores support this conclusion. The second conclusion based on the multiple comparisons is that the rate of change was situationally dependent. Groups II and IV each had one significant multiple comparison, Group III had two, and Group I had four significant comparisons. One possible explanation of this finding is that the number of subjects in each group was responsible for the amount of change that took place. Group I, with only eleven members, had more significant multiple comparisons than any other group that contained more subjects. Conversely, the fewest number of significant multiple comparisons appeared with the largest N, except in Group II. This difference may be due to the decreased amount of interaction in the larger groups. However, since group size was not a manipulated variable, and Group II appears to be an exception, the findings should be tested in another study.

Another conclusion can be drawn from the post hoc analysis. The four instructors of the particular classes tested were compatible linguistically with the students in their classes. However, it is difficult to generalize from only four instructors, even though the basis for testing an instructor's language is established.

DISCUSSION

The answer to the research question--Will clozentropy reveal the amount and rate of language change in a specific social group?--has been answered in the results. Each group's language as measured by clozentropy changed at its own rate and degree. However, reliability and validity questions, arising as to clozentropy as a measure of language change, still remain. Certainly, face validity has been attained, but with no other measure to cross check the present results no concurrent validity can be established. Obviously, replication must be performed if reliability of the instrument is to be completely assessed.

The importance of the findings in this study fall into two different categories. The first conclusion that changes occur in language within a social group, is simply empirical support for the change assumption that has long been held by language theorists. However, the degree and rate in which language changes have not previously been calculated as precisely as with the clozentropy method. By measuring the rate and degree of change, many investigations can focus on applying the results of language change. One suggestion would be to apply the language change measure in the classroom. An evaluation technique could be developed to determine if the students' language changed in relation to the content of

the class. Instructors could be scored with the "outsiders" method to determine their language compatibility with the students. Since this study demonstrated that language change does take place within the classroom, measurement of that change would have a direct effect on evaluating course content, teaching methods, and student participation. Another application would be to test the amount of language change per various persuasion methods. If one persuasion strategy brings about more language change than another, then it seems that persuasion methodology could be improved. In addition, other applications could be generated from the replication with variation of this study.

The second category of findings seems to be the determination of specific social variables involved in producing language change. By using clozentropy as a method of calculating the rate of change, selected variables such as group size, amount of interaction, attitude, and even source credibility could be isolated in the laboratory, and their effects on language change could be studied. Finally, and probably the most important, the opportunity to test many theories about language, language change, and social behavior--previously untestable--now seems one step closer.

FOOTNOTES

[1]Joyce O. Hertzler, A Sociology of Language (New York: Random House, 1965), p. 143.

[2]John J. Gumprez, Language in Social Groups (Stanford, California: Stanford University Press, 1971), pp. 173-174.

[3]Donald K. Darnell, "Clozentropy: A Procedure for Testing English Language Proficiency of Foreign Students," Speech Monographs, 37 (1970) 36-46.

[4]Richard R. Reilly, "A Note on 'Clozentropy: A Procedure for Testing English Language Proficiency of Foreign Students,'" Speech Mongraphs, 38 (1971) 350-352.

[5]Norman H. Nie, Dale H. Bent and C. Hadlai Hull, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1970) A-0005-306, pp. 1-19.

[6]Gene V. Glass and Julian C. Stanley, Statistical Methods in Education and Psychology (Englewood Cliffs, New Jersey: Prentice-Hall, 1970) pp. 383-384.

[7]Darnell, p. 38.